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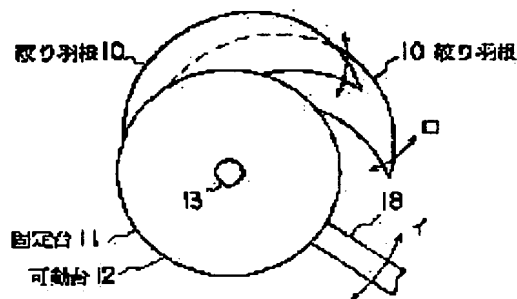
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(54) LIGHT SHIELDING DEVICE AND OPTICAL MICROSCOPE

(57)Abstract:

PROBLEM TO BE SOLVED: To vary either one of or both of the inside diameter and the outside diameter of an aperture slit to cope with the differences of observation magnification and observation sample by moving plural stop blades to form a pseudo circle having a variable outside diameter by means of the plural stop blades.

SOLUTION: The plural stop blades 10 are rotatably held to a fixed base 11, and a movable base 12 coaxially provided with respect to the base 11 is rotated in a direction shown by an arrow by the operation of an operating lever 18 so as to respectively rotate the plural stop blades 10 in a direction shown by an arrow, and the pseudo circle having the variable outside diameter is formed by the stop blades 10. By the constitution, the light of the inside of the pseudo circle is shielded, and the outside diameter of the pseudo circle can be changed. Consequently, when the light shielding device is incorporated and used in an optical device, the light of the center of a luminous flux is shielded, and the diameter of a light shielded part can be varied in accordance with such use that the observation magnification of the optical microscope and the observation sample are changed, for example.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the protection-from-light equipment for being included in optical equipments, such as an optical microscope, and shading the core and the periphery section of the flux of light, and the optical microscope incorporating this protection-from-light equipment.

[0002]

[Description of the Prior Art] Drawing 17 is the block diagram of an optical microscope. On the optical path of a lighting system 1, the collector lens CL, field-diaphragm FS, and the mirror 2 are arranged.

[0003] Furthermore, the lens L for making the reflected light on the street of this mirror 2 carry out image formation of the field-diaphragm FS on Sample Sp, aperture diaphragm AS of light field lighting, a condensing lens Cd, Sample Sp, objective lens alumnus, the image formation lens tangent line, Prism Pr, and ocular OC are arranged.

[0004] With such a configuration, it reflects by the mirror 2 through the collector lens CL and field-diaphragm FS, and the illumination light by which outgoing radiation was carried out from the lighting system 1 is irradiated by Sample Sp through Lens L, aperture diaphragm AS, and a condensing lens Cd.

[0005] And the image of this sample Sp is observed through objective lens alumnus, the image formation lens tangent line, Prism Pr, and ocular OC. By the way, in such an optical microscope, the equipment for shading the core of an illumination-light bundle is needed as lighting for dark field observation or phase contrast observation.

[0006] The approach of inserting in the flux of light the light-gage plate component (ring slit component) which has a ring-like aperture slit as equipment which shades the core of current and such an illumination-light bundle is taken.

[0007] Two or more diameters of a slit which are different since this light-gage plate component corresponds to the difference in an observation scale factor or an observation sample, and components which have slit width are prepared. Moreover, it is common knowledge that the rotating type turret which laid two or more components, and a slider are used as a means for inserting a required component in an illumination-light bundle according to an application, like this light-gage plate component changes an observation scale factor and an observation sample.

[0008]

[Problem(s) to be Solved by the Invention] In order to change an observation scale factor and an observation sample as mentioned above, in order to insert a required component in an illumination-light bundle, it is necessary to switch a rotating type turret and a slider, and large-scale actuation is needed for this switch.

[0009] Moreover, it needs cardiac to be adjusted about each of two or more light-gage plate components for doubling the core of the aperture slit with the optical axis of a microscope. The above actuation is very complicated activities in a routine work which exchanges two or more samples Sp one after another, and observes them.

[0010] Then, this invention can carry out adjustable [of either or both] among the bore of an

aperture slit, or an outer diameter, and aims at offering the protection-from-light equipment which can respond to the difference in an observation scale factor or an observation sample.

[0011] Moreover, this invention aims at offering the optical microscope which can respond to the difference in an observation scale factor or an observation sample using the flare stop which can carry out adjustable [of either or both] among the bore of an aperture slit, or an outer diameter.

[0012]

[Means for Solving the Problem] According to claim 1, it is protection-from-light equipment equipped with the standing ways which hold two or more drawing wings and these drawing wings free movable, and the movable base which is made to carry out movable [of two or more drawing wings], and forms an outer-diameter adjustable false circle by two or more drawing wings.

[0013] If it is such protection-from-light equipment and a movable base will be rotated, for example, two or more drawing wings currently held in standing ways following this revolution will carry out movable. The outer diameter of the false circle of these drawing wing formed more by these drawing wing movable carries out adjustable, and shades the inside of two or more drawing wings.

[0014] According to claim 2, it is protection-from-light equipment equipped with the standing ways which hold two or more drawing wings and these drawing wings free movable, the movable base which is made to carry out movable [of two or more drawing wings], and forms an outer-diameter adjustable false circle by two or more drawing wings, and drawing which shades the outside of two or more drawing wings.

[0015] If it is such protection-from-light equipment and a movable base will be rotated, for example, two or more drawing wings currently held in standing ways following this revolution will carry out movable, and the outer diameter of the false circle of these drawing wing formed more by these drawing wing movable will carry out adjustable. Thereby, while shading the inside of two or more drawing wings, the outside of two or more drawing wings is shaded with drawing.

[0016] In the optical microscope which according to claim 3 irradiates the illumination light through a condensing lens at a sample from the aperture diaphragm of light field lighting at least, and observes this sample through an objective lens and an ocular It is the optical microscope which has arranged at least the protection-from-light equipment which has the movable base which is made to carry out movable [of the standing ways which hold two or more drawing wings and these drawing wing free movable, and two or more drawing wings], and forms an outer-diameter adjustable false circle by two or more drawing wings near the before [a capacitor] side focal location.

[0017] With such an optical microscope, [near the before / a capacitor / side focal location], movable [of two or more drawing wings currently held by rotating a movable base, for example in standing ways] is carried out, and even if there are few false circles formed by these drawing wing, it carries out adjustable [of the outer diameter]. Thereby, even if there are few paths of the gobo of dark field illumination or ring slits of phase contrast lighting, it can carry out adjustable [of the bore].

[0018]

[Embodiment of the Invention]

(1) Explain the gestalt of operation of the 1st of this invention with reference to a drawing hereafter. Drawing 1 is the external view of protection-from-light equipment. This protection-from-light equipment holds two or more drawing wings 10 free [a revolution] to standing ways 11, rotates two or more drawing wings 10 in the arrow-head (b) direction, respectively by rotating the movable base 12 prepared on the same axle to these standing ways 11 in the arrow-head (b) direction, and has composition which forms a false circle stranger good [an outer diameter] than these drawing wing 10.

[0019] In addition, the drawing wing 10 is actually formed free [two or more sheet revolution] along with the periphery of standing ways 11, although two overlapping drawing wings 10 are shown. Drawing 2 is the block diagram which removed standing ways 11, and drawing 3 is seen from a shaft and is the cross-section block diagram of one side.

[0020] two or more drawing wings 10 -- respectively -- thin -- it is formed in the board of the shape of a **** hook. The supporting-point side projection 14 is formed in these drawing wing 10 at hook-like the inside for root headquarters (shaft 13 side), respectively, and the freedom side projection 15 protrudes outside (periphery side of the movable object 12).

[0021] Both these supporting-points side projection 14 and the freedom side projection 15 are formed in the shape of a cylinder, and protrude on both-sides side of the drawing wing 10, respectively. That is, the supporting-point side projection 14 protrudes on the field by the side of the standing ways 11 in the drawing wing 10, and the freedom side projection 15 protrudes on the field by the side of the movable base 12 in the drawing wing 10.

[0022] On the other hand, standing ways 11 and the movable base 12 are formed in the shape of an abbreviation perfect circle, respectively. Among these, the movable base 12 is formed free [a revolution] to the shaft 13 which protruded on the center position of standing ways 11. In this case, the movable base 12 is bound tight with a nut 17 through an elastic member 16 to the shaft 13 of standing ways 11, and is connected by the pivotable pressure.

[0023] The movable base 12 extends in the peripheral face of this movable base 12 radially, and the control lever 18 protrudes on it. Therefore, if a control lever 18 is rotated in the arrow-head (b) direction which is a hoop direction, the movable base 12 will rotate a shaft 13 as a core to standing ways 11 following this.

[0024] Moreover, only the number which the hole 19 extracted to the field by the side of the drawing wing 10 of standing ways 11, and had responded to the number of a wing 10 is formed at equal intervals on the concentric circle periphery of standing ways 11. The supporting-point side projection 14 of the drawing wing 10 is inserted in these holes 19 free [a revolution], respectively.

[0025] The guide slot 20 extracts to the field by the side of the drawing wing 10 of the movable base 12, and on the concentric circle periphery of the movable base 12, only the number according to the number of a wing 10 is regular intervals, and is formed at the radial, respectively. The freedom side projection 15 of the drawing wing 10 is inserted in these guides slot 20 free [migration], respectively.

[0026] Next, an operation of the constituted equipment is explained like the above. If a control lever 18 rotates to the hoop direction (the direction of arrow-head I) of the movable base 12, the movable base 12 will rotate the shaft 13 of standing ways 11 as a core according to the hand of cut and rotation of a control lever 18.

[0027] Two or more drawing wings 10 are interlocked with a revolution of the movable base 12 as shown in drawing 4 , and they rotate the supporting-point side projection 14 as the supporting point, moving the freedom side projection 15 along the inside of the guide slot 20. In addition, drawing 4 is drawing which observed one drawing wing 10 and in which extracting and showing the ends location of the movable range of a wing 10.

[0028] That is, if the freedom side projection 15 moves revolution actuation of each drawing wing 10 along the guide slot 20 by revolution of the movable base 12 and it reaches inside the guide slot 20, the head of the drawing wing 10 will serve as the outermost location which is shown with the broken line of drawing 4 and which was left from the bottom of its heart during the revolution of the movable base 12 like drawing wing 10a.

[0029] With this, if the freedom side projection 15 moves to reverse along the guide slot 20 by revolution of the movable base 12 and it arrives at the outside of the guide slot 20, the head of the drawing wing 10 will serve as an innermost location approaching the center of rotation of the movable base 12 like the drawing wing 10 shown as the continuous line of drawing 4 .

[0030] Drawing 5 and drawing 6 are drawings showing the ends location of the movable range of all the drawing wings 10. Among these, drawing 5 shows the outermost location of all the drawing wings 10 when the freedom side projection 15 reaches inside the guide slot 20 by revolution of the movable base 12, and drawing 6 shows the innermost location of all the drawing wings 10 when the freedom side projection 15 arrives at the outside of the guide slot 20 by revolution of the movable base 12.

[0031] Therefore, it is that all the drawing wings 10 form the false ring-like aggregate, and rotate the supporting-point side projection 14 as the supporting point by overlapping, respectively,

respectively, and the outer diameter of a false ring changes.

[0032] Moreover, since, as for a part for the core of such a false ring, standing ways 11 and the movable base 12 exist, opening of the false ring inside is plugged up and serves as the aggregate which forms the false ring from which an outer diameter changes as two or more whole drawing wing 10 configurations.

[0033] Thus, in the gestalt of implementation of the above 1st, since it constituted so that it might carry out adjustable [of the outer diameter of the false ring which two or more drawing wings 10 currently held in standing ways 11 following this rotate, and is formed by these drawing wing 10] when the movable base 12 was rotated by actuation of a control lever 18, the inside of this false ring can be shaded and the outer diameter of a false ring can be changed.

[0034] Therefore, if it is used building this protection-from-light equipment into optical equipment, the core of the flux of light is shaded, and when changing the path of a protection-from-light part according to an application, such as changing the observation scale factor and observation sample in an optical microscope, it can apply.

[0035] In addition, although the protection-from-light equipment of the gestalt of implementation of the above 1st is applicable to the ring slit at the time of a phase contrast speculum, and the gobo at the time of dark field illumination, naturally it is applicable also to other applications.

(2) Explain the gestalt of operation of the 2nd of this invention below. In addition, the same sign is given to the same part as drawing 2 , and the detailed explanation is omitted.

[0036] Drawing 7 is the external view of protection-from-light equipment, and drawing 8 is the block diagram of this equipment. Two or more drawing wings 10 and movable bases 12 are drawing 8 (b). It is the same configuration as the gestalt of implementation of the above 1st as shown.

[0037] A shaft 13 protrudes and standing ways 30 can attach this shaft 13 free [a revolution of the movable base 12] as a core. A hole 31 extracts to the field by the side of the drawing wing 10 of these standing ways 30, and only the number according to the number of a wing 10 is formed at equal intervals on the concentric circle periphery of standing ways 30. The supporting-point side projection 14 of the drawing wing 10 is inserted in these holes 31 free [a revolution], respectively.

[0038] Moreover, the fixed frame 33 is connected with the periphery side of standing ways 30 through two or more beams 32. This fixed frame 33 is formed in the shape of a ring, and that bore is formed more greatly than the overall diameter of the false ring formed by two or more drawing wings 10.

[0039] Next, an operation of the constituted equipment is explained like the above. If a control lever 18 rotates to the hoop direction (the direction of arrow-head 1) of the movable base 12, the movable base 12 will rotate the shaft 13 of standing ways 11 as a core according to the hand of cut and rotation of a control lever 18.

[0040] Two or more drawing wings 10 rotate in the arrow-head (b) direction by using the supporting-point side projection 14 as the supporting point, a revolution of the movable base 12 being interlocked with and moving the freedom side projection 15 along the inside of the guide slot 20.

[0041] That is, if the freedom side projection 15 moves revolution actuation of each drawing wing 10 along the guide slot 20 by revolution of the movable base 12 and it reaches inside the guide slot 20 like the above, the head of the drawing wing 10 will serve as the outermost location distant from the bottom of its heart during the revolution of the movable base 12 like drawing wing 10a.

[0042] With this, if the freedom side projection 15 moves to reverse along the guide slot 20 by revolution of the movable base 12 and it arrives at the outside of the guide slot 20, the head of the drawing wing 10 will serve as an innermost location approaching the center of rotation of the movable base 12 like the drawing wing 10 shown as the continuous line of drawing 4 .

[0043] Therefore, it is that all the drawing wings 10 form the false ring-like aggregate, and rotate the supporting-point side projection 14 as the supporting point by overlapping, respectively, respectively, and the outer diameter of a false ring changes.

[0044] Thus, it sets in the gestalt of implementation of the above 2nd. The standing ways 30

which hold two or more drawing wings 10 and these drawing wings 10 free movable, The movable base 12 which is made to carry out movable [of two or more drawing wings 19], and forms an outer-diameter adjustable false circle by two or more drawing wings 10, Had the fixed frame 33 of the shape of a ring as drawing which shades the outside of two or more drawing wings 10. Namely, since it constituted so that it might carry out adjustable [of the outer diameter of the false ring which connects the ring-like fixed frame 33 with standing ways 30 through two or more beams 32, and is formed in them by two or more drawing wings 10 within the ring of this fixed frame 33] The outside flare stop of the immobilization which the inside of this false ring can be shaded, and the outer diameter of a false ring can be changed, and shades the flux of light from an outside with a fixed frame 33 is realizable with an one-, i.e., are single, unit.

[0045] In addition, if it is used building this protection-from-light equipment into optical equipment, it cannot be overemphasized that it can apply when shading the core of the flux of light and changing the path of a protection-from-light part according to an application, such as changing the observation scale factor and observation sample in an optical microscope.

[0046] In addition, although the protection-from-light equipment of the gestalt of implementation of the above 2nd is applicable to the ring slit at the time of a phase contrast speculum, and the gobo at the time of dark field illumination, naturally it is applicable also to other applications.

(3) Explain the gestalt of operation of the 3rd of this invention below.

[0047] Drawing 9 is the block diagram of protection-from-light equipment, and is drawing 10 (a). The block diagram and this drawing (b) which were seen from the standing-ways side It is the block diagram seen from the movable base side. This protection-from-light equipment holds the drawing wings 40 and 41 by which plurality overlaps free [a revolution] to standing ways 42, makes radial [of standing ways 42] (the direction of arrow-head NI) carry out straight-line migration of two or more drawing wings 10, respectively by rotating the movable base 43 prepared on the same axle to the standing ways 42 of a parenthesis in the direction of an arrow head (Ha), and has composition which forms a false circle stranger good [an outer diameter] than these drawing wings 40 and 41.

[0048] In addition, two or more drawing wings 40 and 41 are actually formed along with the periphery of standing ways 42, although shown as two overlapping drawing wings. Two or more drawing wings 40 and 41 are formed in the thin ***** sector-like board, respectively.

[0049] Each projections 44, 45, and 46 and 47 protrude on the field by the side of the standing ways 42 of these drawing wings 40 and 41 along a sector-like medial-axis top, respectively, and each projections 48 and 49 protrude on the field by the side of the movable base 43 of each drawing wings 40 and 41 on the sector-like medial axis, respectively.

[0050] In addition, among these projections 48 and 49, projection 48 protrudes in the abbreviation medium on the straight line which connects each projections 44 and 45 of a reverse side face, and the projection 49 protrudes in the abbreviation medium on the straight line which connects each projections 46 and 47 of a reverse side face.

[0051] These projections 44, 45, --, 49 are formed in the shape of a cylinder, respectively. On the other hand, standing ways 42 and the movable base 43 are formed in the shape of an abbreviation perfect circle, respectively. Among these, the movable base 43 is formed free [a revolution] to the shaft 50 which protruded on the center position of standing ways 42. In this case, the movable base 43 is bound tight with a nut through an elastic member as opposed to the shaft 50 of standing ways 42, and is connected by the pivotable pressure.

[0052] The movable base 43 extends in the peripheral face of this movable base 43 radially, and the control lever 51 protrudes on it. Therefore, if a control lever 51 is rotated in the direction of an arrow head (Ha) which is a hoop direction, the movable base 43 will rotate a shaft 50 as a core to standing ways 42 following this.

[0053] Moreover, two or more vertical slits 52 extract to the drawing wing 40 of standing ways 42, and the field by the side of 41, and on the concentric circle periphery of standing ways 42, only the number according to the number of wings 40 and 41 is regular intervals, and is formed radial [of a radial 42, i.e., standing ways,], respectively.

[0054] It is inserted in these length slit 52 respectively free [each projections 44 and 45 of each drawing wings 40 and 41, and migration of 46 and 47]. Two or more horizontal slits 53 extract,

and only the number according to the number of wings 40 and 41 is regular intervals, and it is formed in the drawing wing 40 of the movable base 43, and the field by the side of 41 at the curled form.

[0055] Each projections 48 and 49 of each drawing wings 40 and 41 are inserted in these horizontal slit 53 respectively free [migration], respectively. Next, an operation of the constituted equipment is explained like the above.

[0056] If a control lever 51 rotates to the hoop direction (the direction of arrow-head Ha) of the movable base 43, the movable base 43 will rotate the shaft 50 of standing ways 42 as a core according to the hand of cut and rotation of a control lever 51.

[0057] Two or more drawing wings 40 and 41 are interlocked with a revolution of the movable base 43, and move projections 48 and 49 along the inside of each horizontal slit 53, respectively. With this, each projections 44 and 45 of each drawing wings 40 and 41, and 46 and 47 carry out straight-line migration along the inside of each vertical slit 52 of standing ways 42, respectively.

[0058] Therefore, each drawing wings 40 and 41 carry out straight-line migration radial [of standing ways 42] (the direction of arrow-head NI), respectively. For example, if it observes and sees about migration of one drawing wing 40 as shown in drawing 11 (a) and (b) and the movable base 43 will rotate to standing ways 42 in the direction, for example, arrow-head (e) direction, of standing ways 2, the projection 48 of the drawing wing 40 will carry out straight-line migration of each projections 44 and 45 of the drawing wing 40 along the inside of the vertical slit 52, respectively while moving along the inside of the horizontal slit 53.

[0059] However, the drawing wing 40 carries out straight-line migration radial [of standing ways 42] (the direction of arrow-head HE). Drawing 12 and drawing 13 are all the drawing wings 40 and 41 and drawing of -- showing the ends location of the movable range, drawing 12 shows all the drawing wings 40 and 41 and the outermost location of --, and drawing 13 shows all the drawing wings 40 and 41 and the innermost location of --.

[0060] Therefore, when all the drawing wings 40 and 41 and -- overlap, respectively, it is forming the false ring-like aggregate and carrying out straight-line migration radial [of standing ways 42], respectively, and the outer diameter of a false ring changes.

[0061] Moreover, since, as for a part for the core of such a false ring, standing ways 42 and the movable base 43 exist, opening of the false ring inside is plugged up and serves as the aggregate which forms two or more drawing wings 40 and 41 and the false ring of -- from which an outer diameter changes as a whole configuration.

[0062] Thus, in the gestalt of implementation of the above 3rd, since it constituted so that two or more drawing wings 40 and 41 and -- which are held by rotating the movable base 43 by actuation of a control lever 51 in standing ways 42 might be moved to a radial and it might carry out adjustable [of the outer diameter of a false ring] by these drawing wings 40 and 41 and --, the inside of this false ring can be shaded and the outer diameter of a false ring can be changed.

[0063] Therefore, if it is used building this protection-from-light equipment into optical equipment, the core of the flux of light is shaded, and when changing the path of a protection-from-light part according to an application, such as changing the observation scale factor and observation sample in an optical microscope, it can apply.

[0064] Moreover, a configuration is comparatively simple, a design is simple, and since it extracts by pushing against one end of the vertical slit 52 and wings 40 and 41 and the degree of freedom of -- are regulated after combining these drawing wings 40 and 41 and -- on standing ways 42 in case [of each drawing wings 40 and 41 and --] it is an assembly, even if it does not use a special fixture, the movable base 43 can be attached easily.

[0065] In addition, although the vertical slit 52 and the horizontal slit 53 have penetrated standing ways 42 and the movable base 43, respectively, they may be formed in a slot, without making it penetrate. Moreover, although each drawing wings 40 and 41 and the configuration of -- have prepared the level difference in the direction of a path, two or more steps of this level difference may be prepared. In addition, you may deform if needed on a configuration.

[0066] In addition, although the protection-from-light equipment of the gestalt of implementation of the above 3rd is applicable to the ring slit at the time of a phase contrast speculum, and the gobo at the time of dark field illumination, naturally it is applicable also to other applications.

(4) Explain the gestalt of operation of the 4th of this invention below.

[0067] Drawing 14 is the block diagram of protection-from-light equipment, and drawing 15 is the cross-section block diagram. two or more inside drawing wings 60 -- respectively -- thin -- it is formed in the board of the shape of a **** hook. The supporting-point side projection 61 is formed in these inside drawing wing 60 at hook-like the inside for root headquarters, respectively, and the freedom side projection 62 protrudes outside.

[0068] Both these supporting-points side projection 61 and the freedom side projection 62 are formed in the shape of a cylinder, and protrude on both-sides side of the inside drawing wing 60, respectively. On the other hand, standing ways 63 and the movable base 64 are formed in the shape of an abbreviation perfect circle, respectively. Among these, the movable base 64 is formed free [a revolution] to the shaft 65 which protruded on the center position of standing ways 63. In this case, the movable base 64 is bound tight with a nut 67 through an elastic member 66 to the shaft 65 of standing ways 63, and is connected by the pivotable pressure.

[0069] The movable base 64 extends in the peripheral face of this movable base 64 radially, and the control lever 68 protrudes on it. Therefore, if a control lever 64 is rotated in the arrow-head (g) direction which is a hoop direction, the movable base 64 will rotate a shaft 65 as a core to standing ways 63 following this.

[0070] Moreover, only the number with which the hole 69 had responded to the number of the inside drawing wing 60 in the field by the side of the inside drawing wing 60 of standing ways 63 is formed at equal intervals on the concentric circle periphery of standing ways 63. The supporting-point side projection 61 of the inside drawing wing 60 is inserted in these holes 69 free [a revolution], respectively.

[0071] In the field by the side of the inside drawing wing 60 of the movable base 64, on the concentric circle periphery of the movable base 64, only the number [slot / 70 / guide] according to the number of the inside drawing wing 60 is regular intervals, and is formed at the radial, respectively. The freedom side projection 62 of the inside drawing wing 60 is inserted in these guides slot 70 free [migration], respectively.

[0072] In addition, standing ways 63 are what formed the ring section 75 in one through two or more beams 73 to the shaft center section 71 as shown in drawing 14 . On the other hand, the outer-diameter drawing device 80 is established.

[0073] Two or more outside drawing wings 81 are formed in the board of a light-gage radii configuration, respectively. The supporting-point side projection 82 is formed in the edge of one of the two of a radii configuration at these outsides drawing wing 81, respectively, and the freedom side projection 83 protrudes on another edge.

[0074] Both these supporting-points side projection 82 and the freedom side projection 83 are formed in the shape of a cylinder, and protrude on both-sides side of the outside drawing wing 81, respectively. The movable frame 84 is formed free [a revolution] to the shaft 65 of standing ways 63. In this case, the movable frame 84 is pressed down by extent from which it does not separate by the presser-foot ring 86 through a spacer 85 in the shaft 65 direction.

[0075] Moreover, the movable frame 84 is radially prolonged in the peripheral face of the movable frame 84, and the control lever 87 protrudes on it. Therefore, if a control lever 87 is rotated in the arrow-head (h) direction which is a hoop direction, the movable frame 84 will rotate a shaft 65 as a core to standing ways 63 following this.

[0076] Moreover, only the number [hole / 88] according to the number of the outside drawing wing 81 is formed at equal intervals on the concentric circle periphery in the field by the side of the outside drawing wing 81 of standing ways 63 at the ring section 75 of standing ways 63. The supporting-point side projection 82 of the outside drawing wing 81 is inserted in these holes 88 free [a revolution], respectively.

[0077] Only the number according to the number of the outside drawing wing 81 is regular intervals, and the guide slot 89 is formed in the field by the side of the outside drawing wing 81 of the movable frame 84 at the radial, respectively. The freedom side projection 83 of the outside drawing wing 81 is inserted in these guides slot 89 free [migration], respectively.

[0078] In addition, the notching 90 for letting each control levers 68 and 87 pass on the outside of standing ways 63 and the slide hole 91 are formation *****. Next, an operation of the

constituted equipment is explained like the above.

[0079] If a control lever 68 rotates to the hoop direction (the direction of arrow-head TO) of the movable base 64, the movable base 64 will rotate the shaft 65 of standing ways 63 as a core according to the hand of cut and rotation of a control lever 68.

[0080] Two or more inside drawing wings 60 are interlocked with a revolution of the movable base 64, and moving the freedom side projection 62 along the inside of the guide slot 70, as shown in drawing 14 by using the supporting-point side projection 61 as the supporting point, they rotate in the direction of an arrow head (Li).

[0081] Therefore, it is that all the inside drawing wings 60 form the false ring-like aggregate, and rotate the supporting-point side projection 61 as the supporting point by overlapping, respectively, respectively, and the outer diameter of a false ring changes.

[0082] On the other hand, if a control lever 87 rotates to the hoop direction (the direction of arrow-head CHI) of standing ways 63, the movable frame 84 will rotate the shaft 65 of standing ways 63 as a core according to the hand of cut and rotation of a control lever 87.

[0083] Two or more outside drawing wings 81 are interlocked with a revolution of the movable frame 84, and moving the freedom side projection 83 along the inside of the guide slot 89, as shown in drawing 14 by using the supporting-point side projection 82 as the supporting point, they rotate in the arrow-head (j) direction.

[0084] Therefore, it is that all the outside drawing wings 81 form the false ring-like aggregate, and rotate the supporting-point side projection 82 as the supporting point by overlapping, respectively, respectively, and the bore of a false ring changes.

[0085] Thus, it sets in the gestalt of implementation of the above 4th. The standing ways 63 which hold two or more inside drawing wings 60 and these inside drawing wings 60 free movable, The movable base 64 which is made to carry out movable [of two or more inside drawing wings 60], and forms an outer-diameter adjustable false circle by two or more inside drawing wings 60. On the concrete target which prepared free movable, two or more outside drawing wings 81 as drawing which shades the outside of two or more inside drawing wings 60 The standing ways 63 which hold the outside drawing wing 81 free movable to a periphery side while holding two or more inside and outside drawing wings 60 and 81, and inside drawing wings 60 free movable to an inner circumference side, respectively, The movable base 64 which is made to carry out movable [of the inside drawing wing 60], and forms an outer-diameter adjustable false circle by these inside drawing wing 60, Had the movable frame 84 which is made to carry out movable [of the outside drawing wing 81], and forms a bore adjustable false circle by these outsides drawing wing 81. Namely, by rotating the movable base 64 by actuation of a control lever 68, move two or more inside drawing wings 60, and it carries out adjustable [of the outer diameter of a false ring]. And since two or more outside drawing wings 81 were moved, adjustable [of the bore of an opening false ring] was carried out and it was constituted by rotating the movable frame 84 by actuation of a control lever 87 False ring-like opening is formed of the combination of an inside false ring and an outside opening false ring, the bore and outer diameter of false ring opening can be changed by migration of each control levers 68 and 87, and it can carry out adjustable [of the width of face and the path of an aperture slit].

[0086] Therefore, if it is used building this protection-from-light equipment into optical equipment, the core of the flux of light is shaded, and when changing the path of a protection-from-light part according to an application, such as changing the observation scale factor and observation sample in an optical microscope, it can apply.

[0087] In addition, although the protection-from-light equipment of the gestalt of implementation of the above 4th is applicable to the ring slit at the time of a phase contrast speculum, and the gobo at the time of dark field illumination, naturally it is applicable also to other applications.

(5) Explain the gestalt of operation of the 5th of this invention below.

[0088] Drawing 16 is the block diagram of the optical microscope which applied protection-from-light equipment. In addition, the same sign is given to the same part as drawing 17, and the detailed explanation is omitted. this optical microscope -- each protection-from-light equipment of the gestalt of the 1st - the 4th operation of above-mentioned this invention -- insertion arrangement of one of the protection-from-light equipments 100 is carried out inside at optical

system.

[0089] For example, the protection-from-light equipment 100 possessing the standing ways 11 which hold two or more drawing wings 10 and these drawing wings 10 free movable, and the movable base 12 which is made to carry out movable [of two or more drawing wings 10], and forms an outer-diameter adjustable false circle by two or more drawing wings 11 is arranged.

[0090] Moreover, for example, irradiate the illumination light through a condensing lens Cd at Sample Sp from field-diaphragm FS of light field lighting at least, and it sets to the optical microscope which observes this sample Sp through objective lens alumnus and ocular OC. The inside and the outside drawing wings 60 and 81 of the plurality near the before [Capacitor Cd] side focal location respectively, The standing ways 63 which hold the outside drawing wing 81 free movable to a periphery side while holding the inside drawing wing 60 free movable to an inner circumference side, Protection-from-light equipment 100 equipped with the movable base 64 which is made to carry out movable [of the inside drawing wing 60], and forms an outer-diameter adjustable false circle by these inside drawing wing 60, and the movable frame 84 which is made to carry out movable [of the outside drawing wing 81], and forms a bore adjustable false circle by these outsides drawing wing 81 is arranged.

[0091] The insertion point of these protection-from-light equipment 100 is near the aperture diaphragm AS of light field lighting, and is a before [the condensing lens Cd of an illumination system] side focal location. Image formation of the image of the flare stop of protection-from-light equipment 100 is carried out to the backside [objective lens alumnus] focal location 101 through a condensing lens Cd and objective lens alumnus.

[0092] That is, protection-from-light equipment 100 acts in the optical system of an optical microscope as the gobo of dark field illumination, or a ring slit of phase contrast lighting. Therefore, if insertion arrangement of the protection-from-light equipment 100 is carried out, it can carry out adjustable [of the bore and outer diameter of the path of the gobo of dark field illumination or the ring slit of phase contrast lighting] to the optical system of an optical microscope. The dark field observation or phase contrast observation which was being performed by the difference in an observation scale factor or an observation sample like before by replacing two or more ring slit components (light-gage plate component) from which width of face and a path differ Strange single good protection-from-light equipment 100 can perform, and large-scale actuation of moving the rotating type turret and slider of a capacitor and exchanging a ring slit, and the cardiac adjustment which was being performed for every ring slit become unnecessary.

[0093] Moreover, if it is near the aperture diaphragm AS of light field lighting and protection-from-light equipment 100 is removed from a before [the condensing lens Cd of an illumination system] side focal location, it can be immediately used as a bright field microscope.

[0094] In addition, when using it, limiting protection-from-light equipment 100 to the gobo of dark field illumination, it is near the aperture diaphragm AS of the light field lighting which arranges this protection-from-light equipment 100, and a before [the condensing lens Cd of an illumination system] side focal location does not need to be a before [a condensing lens Cd] side focal location strictly, and may be carrying out the location gap somewhat in the direction of an optical axis.

[0095] Moreover, either an erection mold or a handstand mold is OK as the optical microscope which applies protection-from-light equipment 100. Moreover, it may be made to carry out adjustable [of the bore or outer diameter of the protection-from-light equipment explained with the gestalt of each operation] using the driving means of a motor etc.

[0096]

[Effect of the Invention] As a full account was given above, according to this invention, adjustable [of either or both] can be carried out among the bore of an aperture slit, or an outer diameter, and the protection-from-light equipment which can respond to the difference in an observation scale factor or an observation sample can be offered.

[0097] Moreover, according to this invention, false ring-like opening is formed with the combination of an inside false ring and an outside opening false ring, and the protection-from-light equipment which can carry out adjustable [of the width of face and the path of an aperture

slit] can be offered by changing the bore of these false ring opening, and an outer diameter.

[0098] Moreover, according to this invention, the optical microscope which can respond to the difference in an observation scale factor or an observation sample using the flare stop which can carry out adjustable [of either or both] among the bore of an aperture slit or an outer diameter can be offered.

[0099] Moreover, according to this invention, the optical microscope which can carry out adjustable [of the path of the gobo in dark field illumination] can be offered. Moreover, according to this invention, the optical microscope which can carry out adjustable [of the width of face and the path of a ring slit in phase contrast lighting] can be offered.

[Translation done.]

* NOTICES *

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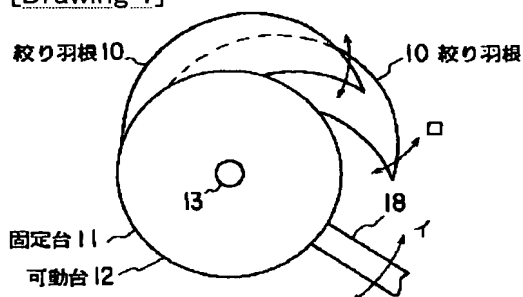
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

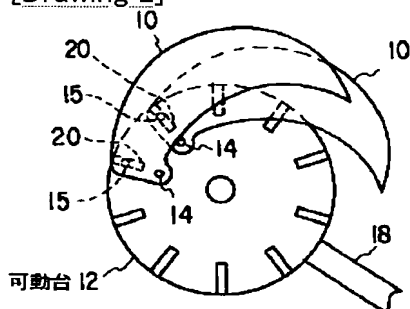
3.In the drawings, any words are not translated.

DRAWINGS

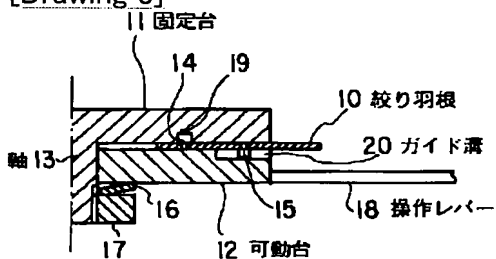
[Drawing 1]



[Drawing 2]

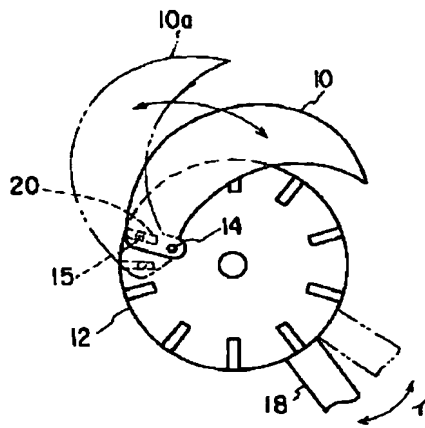


[Drawing 3]

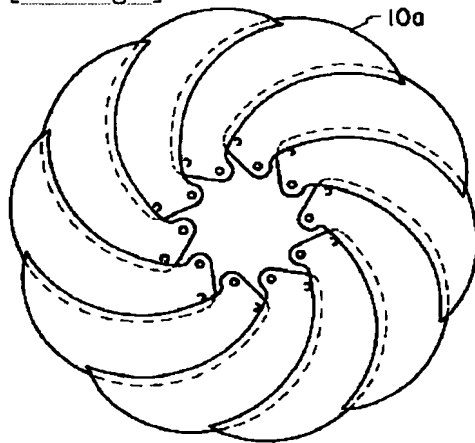


[Drawing 4]

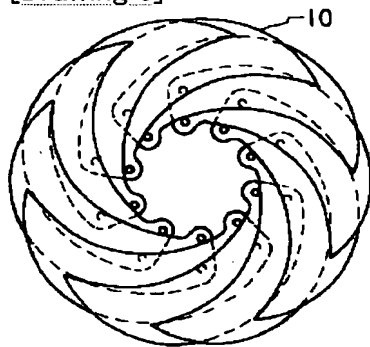
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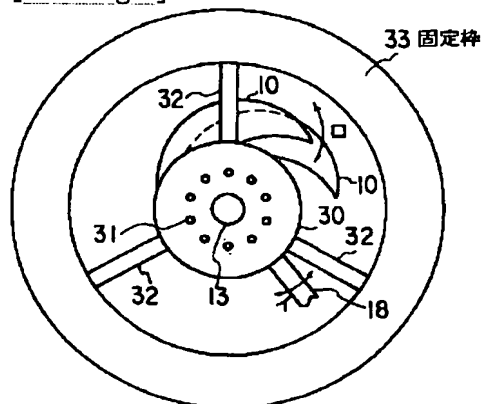
[Drawing 5]



[Drawing 6]

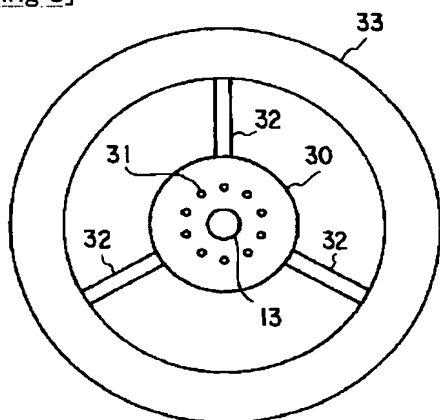


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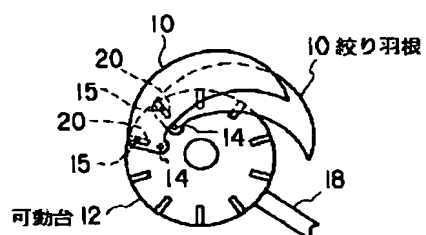


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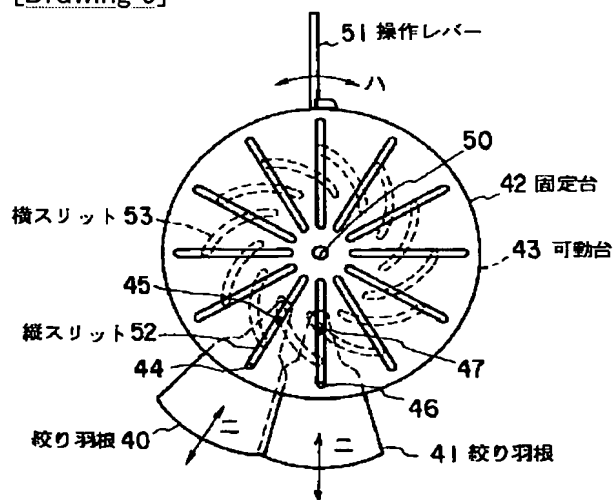
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(b)

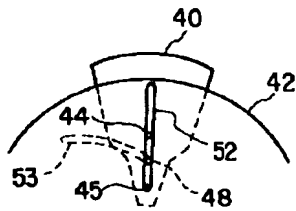


[Drawing 9]

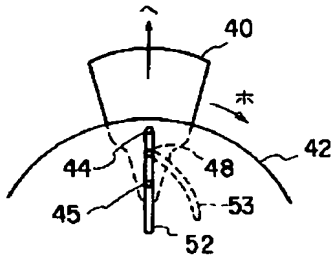


[Drawing 11]

(a)

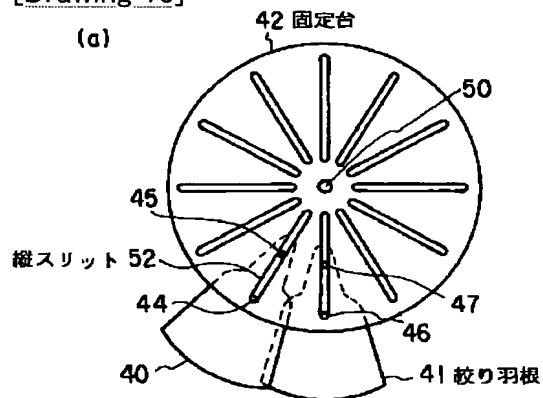


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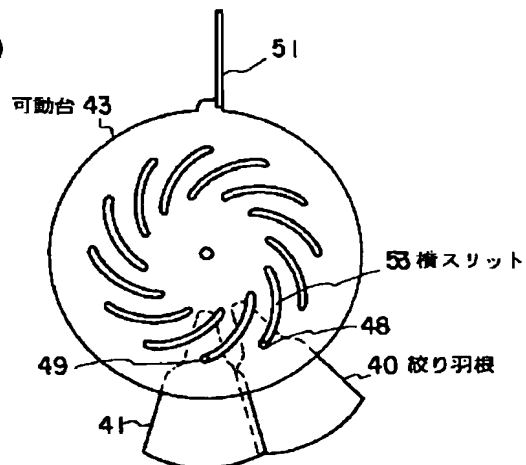


[Drawing 10]

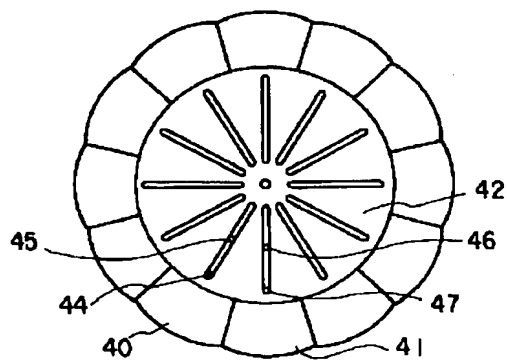
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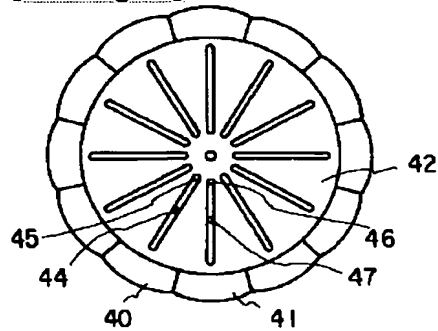
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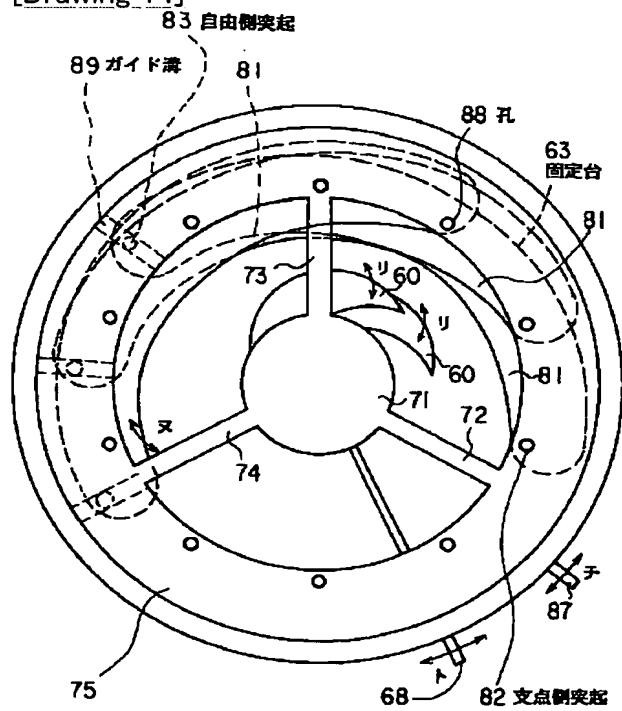
[Drawing 12]



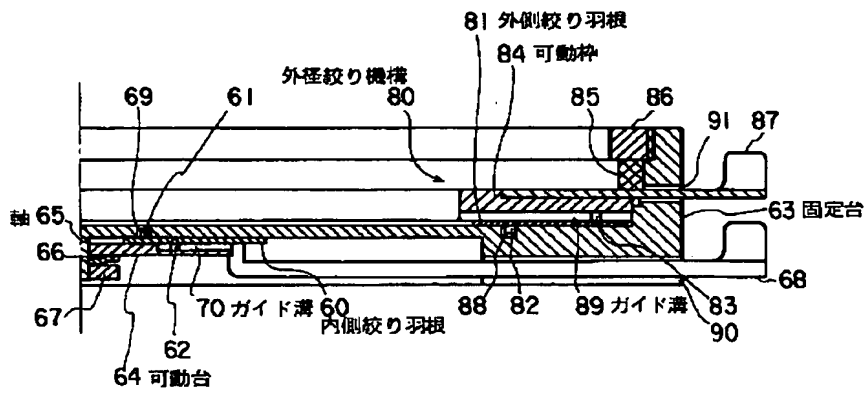
[Drawing 13]



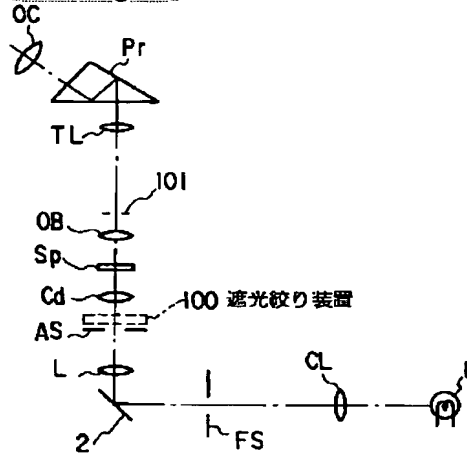
[Drawing 14]



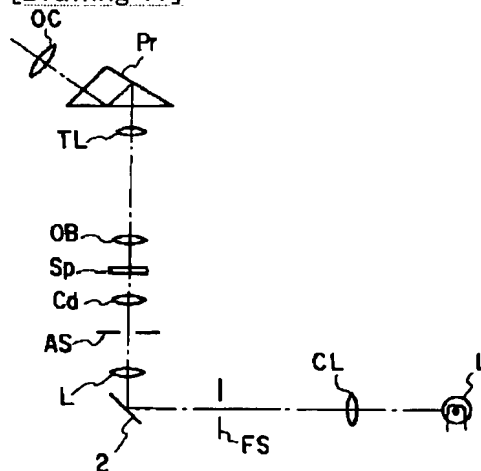
[Drawing 15]



[Drawing 16]



[Drawing 17]



[Translation done.]